Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-20 (cancelled)

21. (Previously Presented) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes;

means for configuring a plurality of connections in the network into a plurality of spectral groups, wherein configuring the plurality of connections includes:

routing each connection from a source node to a destination node;

partitioning each of a plurality of the connections into a plurality of subconnections; and

forming spectral groups for connections and subconnections that are routed on identical paths.

22. (Previously Presented) The network of claim 21, wherein at least one of the spectral group routers is an all-optical switch including at least three ports, wherein each port is connected to a different optical communications path, and wherein optical signals entering one port can be selectively output at another port without undergoing an optical to electrical to optical conversion.

23. (Previously Presented) The network of claim 22, wherein the optical switch selectively switches signals in groups of one or more spectral groups.

24. (Previously Presented) The network of claim 23, wherein at least one of the spectral group routers is an all-optical add/drop multiplexer including a first port, a second port, an add port, and a drop port, wherein at least a portion of the optical signals entering the first port can be output at the second port without an optical to electrical to optical conversion, and wherein at least a portion of the optical signals can be selectively output at the drop port, and wherein additional signals provided at the add port can be output at the second port.

25. (Previously Presented) The network of claim 24, wherein the add/drop multiplexer selectively drops signals in groups of one or more spectral groups.

26. (Previously Presented) The network of claim 21, wherein the means for configuring a plurality of connections includes a network management system.

27. (Previously Presented) The network of claim 26, wherein the network management system utilizes an optical waveband hierarchy which includes a network management level, and wherein the means for configuring a plurality of connections is resident at the network management level of the optical waveband hierarchy.

28. (Previously Presented) The network of claim 26, wherein one of the spectral group routers further comprises:

a plurality of waveband demultiplexers, each having an input port connected to an optical communications path, and a plurality of output ports;

a plurality of optical signal splitters, each optical signal splitter having an input port connected to one of the output ports of one of the waveband demultiplexers, and each optical signal splitter having a plurality of output ports;

a plurality of waveband selectors, each connected to one of the output ports of the optical signal splitters;

a plurality of optical signal couplers, each optical signal coupler having a plurality of input ports, each connected to one of the waveband selectors, and each optical signal splitter having an output port; and

a plurality of waveband multiplexers, each having a plurality of input ports, each input port connected to one of the output ports of the optical signal couplers, and each having an output port connected to an optical communications path.

29. (Previously Presented) The network of claim 26, wherein after forming spectral groups, the network management system performs a method of:

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups; and

converting spectral groups that exceed the maximum capacity of the spectral groups into two or more spectral groups that do not exceed the maximum capacity of the spectral groups.

30. (Previously Presented) The network of claim 26, wherein after converting spectral groups the network management system performs a method of:

determining whether the number of spectral groups exceeds the maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding the connections and/or subconnections from at least two spectral groups into a combined spectral group, so that the combined spectral group includes connections and/or subconnections that are not routed on identical paths.

31. (Previously Presented) The network of claim 30, wherein combining spectral groups includes performing at least one of subsetting operations, merging operations, and branching operations.

32. (Previously Presented) The network of claim 31, wherein the spectral groups each include at least one connection or subconnection and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first spectral group is a sub-set of the second spectral group;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

33. (Previously Presented) The network of claim 31, wherein the spectral groups each include at least one of a connection and a subconnection, and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first and second spectral groups overlaps at opposite ends;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

34. (Previously Presented) The network of claim 31, wherein the spectral groups each include at least one connection and/or subconnection and wherein the spectral groups have a maximum capacity of connections and subconnections that can be carried in a single spectral group, and wherein combining spectral groups includes:

determining a minimum fill rate for a combined spectral group;

determining whether a first spectral group can be combined with a second spectral group according to predetermined criteria, wherein the criteria includes:

the first and second spectral groups overlap and the first spectral group extends beyond the second spectral group at a location other then an end of the second spectral group;

a fill rate of the combined spectral group is at least equal to the minimum fill rate;

the combined spectral group includes a total number of connections and subconnections that are equal to or less than the maximum capacity for a single spectral group; and

combining spectral groups that satisfy the predetermined criteria.

35. (Previously Presented) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes and forming a plurality of links;

means for organizing the optical network, wherein organizing the optical network includes:

defining a plurality of spectral groups, wherein each spectral group includes at least one link, and at least one spectral group includes a plurality of links;

assigning a plurality of signal channels to the at least one spectral group including a plurality of links, wherein at least one of the signal channels is assigned to less than all of the links in the spectral group.

36. (Previously Presented) The network of claim 35, wherein the means for organizing the optical network includes a network management system.

37. (Previously Presented) The network of claim 36, wherein defining a plurality of spectral groups includes:

routing a plurality of signal channels from a source to a destination to form a plurality of connections;

partitioning each of at least one connection into a plurality of subconnections; and

forming spectral groups for connections and subconnections that are routed on identical paths.

38. (Previously Presented) The network of claim 37, further comprising after forming a spectral group:

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups;

converting spectral groups that exceed the maximum capacity of the spectral groups into two or more spectral groups that do not exceed the maximum capacity of the spectral groups.

39. (Previously Presented) The network of claim 38, further comprising after converting spectral groups:

determining whether the number of spectral groups exceeds a maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding connections and subconnections from at least two spectral groups into a combined spectral group, so that the combined spectral group can include connections and subconnections that are not routed on identical paths.

40. (Previously Presented) A wavelength division multiplexed optical communications network, comprising:

a plurality of spectral group routers through which optical signals can pass without undergoing an optical to electrical to optical conversion;

optical communication paths optically connecting the nodes and forming a plurality of links;

a network management system for organizing the network, wherein organizing the network includes:

routing a plurality of signal channels from a source to a destination to form a plurality of connections;

partitioning each of at least one connection into a plurality of subconnections;

forming spectral groups for connections and subconnections that are routed on identical paths;

determining whether any of the spectral groups exceed a maximum capacity of the spectral groups;

converting spectral groups that exceed the maximum capacity of the spectral groups into at least two spectral groups that do not exceed the maximum capacity of the spectral groups;

determining whether the number of spectral groups exceeds a maximum number of available spectral groups;

combining spectral groups when the number of spectral groups exceeds the maximum number of available spectral groups, wherein combining includes adding connections and subconnections from at least two spectral groups into a combined spectral group; and

assigning a plurality of connections and subconnections to the at least one spectral group including a plurality of links, wherein at least one of the subconnections and connections is assigned to less than all of the links in the spectral group.